

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 11

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte GERALD T. MICHAEL, WEI SU, and MICHAEL A. DUKES

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Appeal No. 1999-1608  
Application No. 08/506,943

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ON BRIEF

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Before KRASS, LALL, and GROSS, Administrative Patent Judges.

KRASS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 17-23, all of the pending claims.

The invention is directed to the conversion of scanned images of schematic diagrams of electrical circuits into computer aided design programs/tools and/or VHSIC Hardware Description Language (VHDL).

Independent claim 17 is reproduced as follows:

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17. A method for automatically generating a non- pictorial description of an electronic circuit from a pictorial schematic image thereof by scanning said pictorial schematic image so as to obtain data comprising a non- pictorial description of the pictorial schematic image and processing that data in such a manner as to obtain the non- pictorial description of the electronic circuit, wherein such non-pictorial description of the electronic circuit comprises an identification and listing of the circuit's components, the input and output terminals of those components, and all interconnections among those input and output terminals.

The examiner relies on the following references:

Rutenbar et al. (Rutenbar)	4,541,114	Sep. 10, 1985
Bhaskaran	4,949,388	Aug. 14, 1990
Rostoker et al. (Rostoker)	5,572,437	Nov. 05, 1996
		(filed May 20, 1994)

Claims 17-23 stand rejected under 35 U.S.C. § 103 as unpatentable over the combination of Bhaskaran, Rostoker and Rutenbar.

Reference is made to the brief and answer for the respective positions of appellants and the examiner.

### OPINION

At the outset, we note that all claims stand or fall together, in accordance with appellants' grouping of the claims at page 3 of the brief. Accordingly, we will concentrate on independent claim 17.

The examiner cites Bhaskaran for the recognition of graphic symbols wherein a non-pictorial description of an electronic circuit is generated from a pictorial schematic

image. Column 1, lines 32-50, of Bhaskaran makes it clear that the reference envisions “electric circuit element symbols” being converted into digital data that can be input to various CAD systems.

As the examiner recognizes [answer-page 4], Bhaskaran is “silent about specific details regarding non-pictorial description.” Therefore, the examiner turns to Rostoker for a teaching of “creating and verifying structural logic model of electronic design from behavioral description including generation of logic and timing models comprising the step of generating non-pictorial description and listing of the electronic circuits” [answer-page 5, citing figure 2 and elements 205 (206?), 208, 210 and 212, as well as column 22, lines 45-68 of the reference]. The examiner also relies on Rutenbar for disclosing “routing techniques using serial neighborhood image analyzing system comprising the step of generating interconnections among the inputs and outputs (column 4, lines 10-55)” [answer-page 5].

The examiner then concludes that it would have been obvious to use the step of generating a non-pictorial description, as described by Rostoker, and the generation of input and output terminals of the logic components and all interconnections among them, as taught by Rutenbar, in the system of Bhaskaran because the secondary references “merely provide the details of most frequently used logic symbols and a

system to perform automatic routing or layout of conductor patterns on circuits such as printed circuit boards and integrated circuits” [answer-page 5].

For their part, appellants contend that Bhaskaran does “recognize” symbols but is not interested in “the essence of the circuit” [brief-page 6]. By contrast, according to appellants, the instant invention is concerned with “determining inputs and outputs and direction of signal flow” [brief-page 6].

Appellants further contend that neither Rostoker nor Rutenbar is in the same field of endeavor as Bhaskaran and that, therefore, they cannot be properly combined with Bhaskaran. Appellants identify Rostoker as beginning with a behavioral description of the circuit to be designed and then generating an appropriate circuit meeting that behavioral description, whereas Bhaskaran is concerned with generating a better pictorial representation from a poor one. With regard to Rutenbar, appellants contend [brief-page 8] that this reference is concerned with “geography, not function” because Rutenbar needs to know the geographic end points of the connection to be made and those areas on the device which are available for running conductors. Appellants also opine that Rutenbar “is dealing with conductor layout in two dimensions, and not schematic representation” and, so, “he has no way of dealing with signal crossovers, a critical problem in Applicants’ invention” [brief-page 8].

With regard to appellants' last observation, while "signal crossovers" may be "critical" to the instant invention, we find no mention of this "critical" element in independent claim 17. Claim 22 brings in the concept of "crossover," but appellants' grouping of claims indicates that this claim will stand or fall with independent claim 17.

As stated at pages 8-9 of the brief, appellants' invention

is not concerned with reproducing a drawing or making a better pictorial description, nor is it concerned with laying out conductor runs on a two dimensional space. [The] invention is concerned with automatically scanning a pictorial schematic depiction of an electronic circuit, extracting information about the functional essence of the circuit, and utilizing that information to describe the circuit for the purpose of manufacture of that circuit, not a depiction thereof.

While Bhaskaran does disclose the concept of generating a non-pictorial description of a scanned electric circuit, it is clear that the reference does not disclose or suggest the details of the non-pictorial description. Instant claim 17 requires that description to comprise "an identification and listing of the circuit's components, the input and output terminals of those components, and all interconnections among those input and output terminals."

Appellants accept the examiner's characterization of Rostoker as "creating and verifying a structural logic model of electronic design from a behavioral description,

including the generation of logic and timing models comprising the step of a non-pictorial description and listing of electronic circuits” even though they object to the citing of Rostoker for the first time in the final rejection [brief-page 6].<sup>1</sup> However, appellants contend that Rostoker is not properly combinable with Bhaskaran and we agree.

If Rostoker begins with a behavioral description of the circuit to be designed and then generates an appropriate circuit meeting that behavioral description, it is difficult to see why, or in what manner, the skilled artisan would have looked to this reference in order to modify Bhaskaran which is directed to improving pictorial representations. As far as the instant claimed invention is concerned, it starts with an electric circuit schematic and scans that pictorial schematic image to convert it into a non-pictorial functional listing of the circuit’s components. Thus, the relevancy of Rostoker’s generation of an appropriate circuit from a behavioral description is elusive.

Further, with regard to Rutenbar, it is not clear to us how or why the artisan would have been led to take the teaching of laying out conductor runs in a two dimensional space and apply that teaching to a combination of Bhaskaran and Rostoker to somehow provide for the claimed non-pictorial description of a circuit

wherein that description comprises “an identification and listing of the circuit’s

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<sup>1</sup>This objection is not an appealable matter and is therefore not before us.

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components, the input and output terminals of those components, and all interconnections among those input and output terminals,” as claimed.

Since we do not find a prima facie case of obviousness established by the combination of Bhaskaran, Rostoker and Rutenbar, we will not sustain the examiner’s rejection of claims 17-23 under 35 U.S.C. § 103.

The examiner’s decision is reversed.

REVERSED

ERROL A. KRASS  
Administrative Patent Judge

PARSHOTAM S. LALL  
Administrative Patent Judge

ANITA PELLMAN GROSS  
Administrative Patent Judge

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